What is claimed is:

1.   A method of operating a video gaming machine which simulates a real physical game initiated by placing an object in motion in accordance with a set of initial conditions and proceeding to one of a plurality of outcomes corresponding respectively to final resting conditions of the object, the method comprising:

establishing in software a mathematical model of the game including a plurality of rules governing movement of the object once it is placed in motion,

establishing a range of possible values for each of a plurality of parameters,

randomly selecting for each parameter a value from its associated range of values to establish the set of initial conditions,

running the set of initial conditions through the model for simulating movement of the object to a final resting condition to determine the outcome, and

displaying the simulated movement of the object.

2.   The method of claim 1, wherein the parameters include velocity, angle or direction and spin or rotation.

3.   The method of claim 1, wherein the object is a ball.

4. The method of claim 1, and further comprising predetermining a pay table including a list of possible outcomes and a corresponding win mount for each outcome and, after determining the outcome, looking up the outcome in the pay table and awarding the player the corresponding win amount.

5. A method of operating a video gaming machine which simulates a real physical game initiated by placing an object in motion in accordance with a set of initial conditions and proceeding to one of a plurality of outcomes corresponding respectively to final resting conditions of the object, the method comprising:

establishing in software a mathematical model of the game including a plurality of rules governing movement of the object once it is placed in motion,

establishing a collection of sets of initial conditions large enough to simulate random play and assigning to each set a probability of occurrence,

randomly selecting a set of initial conditions from the collection in accordance with their probabilities of occurrence,

running the selected set of initial conditions through the model for simulating movement of the object to a final resting condition to determine the outcome, and

displaying the simulated movement of the object.

6. The method of claim 5, wherein the collection of sets of initial conditions is established by running the model a large number of times using a different set of initial

conditions each time and recording each set of initial conditions and its outcome, and selecting from the recorded sets of initial conditions the collection of sets.

7.   The method of claim 6, and further comprising assigning to each set of initial conditions in the collection an identifying number to make up a range of numbers, the random selection of a set of initial conditions from the collection being effected by randomly selecting a number in the range and looking up the corresponding set of initial conditions.

8.   The method of claim 5, wherein the parameters include velocity, angle or direction and spin or rotation.

9.   The method of claim 5, and further comprising predetermining a pay table including a list of possible outcomes and a corresponding win amount for each outcome and, after determining the outcome, looking up the outcome in the pay table and awarding the player the corresponding win amount.

10.   The method of claim 5, wherein the object is one of plural objects, and further comprising performing the last three steps of the method of claim 5 for each object.

11.   The method of claim 11, wherein the objects are balls.

12. The method of claim 10, and further comprising establishing a collision bonus for each collision of one object with another.

13. The method of claim 12, wherein the objects are balls, the collision bonus including awarding the player an additional ball.

14. The method of claim 12, and further comprising predetermining a pay table including a list of possible outcomes and a corresponding win amount for each outcome, after determining the outcome for each object, looking up each outcome in the pay table and awarding the player the corresponding win amount, the collision bonus including an additional win amount.

15. The method of claim 14, wherein the collision alters the paths of the objects and, therefore, their final outcomes, the collision bonus being the win amounts corresponding to the outcomes the colliding objects would have reached had the balls not collided.

16. The method of claim 14, wherein the collision does not affect the paths of the balls, the collision bonus being an arbitrary win amount.

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17. A method of operating a video gaming machine which simulates a real physical game initiated by placing an object in motion in accordance with a set of initial conditions and proceeding along a route to one of a plurality of outcomes corresponding respectively to final resting conditions of the object, the method comprising:

determining a finite collection of points on a play field including a route starting point and at least one route end point corresponding to a final resting condition and a finite collection of possible paths of the object from one point to another such that each point except route end points may have one or more paths leading away from it,

assigning a probability of occurrence to each path and to each point,

randomly selecting a path from among the paths leading away from the route starting point in accordance with their probabilities of occurrence,

causing the object to traverse the selected path to the point it leads to,

then randomly selecting a path from among the paths starting at the point at which the object is currently located in accordance with their probabilities of occurrence,

then repeating the preceding two steps until a route end point is reached, and

displaying the simulated movement of the object from route staring point to the route end point.

18. The method of claim 17, wherein each point other than the route starting point and a route end point corresponds to an object-redirecting obstruction.

19. The method of claim 18, wherein the play field and the obstructions thereon are stationary.

20. The method of claim 17, wherein the object is a ball.

21. The method of claim 17, and further comprising predetermining a pay table including a list of possible outcomes and a corresponding win amount for each outcome and, after determining the outcome, looking up the outcome in the pay table and awarding the player the corresponding win amount.

22. A method of operating a video gaming machine which simulates a real physical game initiated by placing an object in motion in accordance with a set of initial conditions and proceeding to one of a plurality of outcomes corresponding respectively to final resting conditions of the object, the method comprising:

establishing in software a mathematical model of the game including a plurality of rules governing movement of the object once it is placed in motion,

establishing a pay table including a list of possible outcomes and the probability of occurrence for each outcome,

randomly selecting an outcome based on its probability of occurrence,

running the selected outcome through the model in reverse to produce a set of initial conditions, then

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running the set of initial conditions through the model in proper order for simulating

movement of the object to the selected outcome, and

displaying the simulated movement of the object.

23.   The method of claim 22, and further comprising establishing for each outcome a

set of final conditions.

24.   The method of claim 23, wherein each set of final conditions is established by

random selection from a collection of possible final conditions.

25.   The method of claim 22, wherein the establishing of the pay table includes

establishing a corresponding win amount for each outcome and further comprising looking up the

selected outcome in the pay table and awarding the player the corresponding win amount.

26.   A method of operating a video gaming machine which simulates a real physical

game initiated by placing an object in motion in accordance with a set of initial conditions and

proceeding to one of a plurality of outcomes corresponding respectively to final resting

conditions of the object, the method comprising:

determining a finite collection of points on a play field including a route starting point

and at least one route end point corresponding to a final resting condition and a finite collection

of possible paths of the object from one point to another such that each point except route end

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points may have one or more paths leading away from it,

assigning a probability of occurrence to each path and to each point,

randomly selecting a point from among the route end points in accordance with their probabilities of occurrence,

randomly selecting a path from among the paths leading to the selected route end point in accordance with their probabilities of occurrence,

causing the object to traverse the selected path in reverse to the point it leads away from,

then randomly selecting a path from among the paths leading to the point at which the object is currently located in accordance with their probabilities of occurrence,

then repeating the preceding two steps until the route starting point is reached, and

then causing the object to retrace the selected paths from the route starting point of the selected route end point for simulating movement of the object along the route, and

displaying the simulated movement of the object along the route from the route starting point to the selected route end point.

27.   The method of claim 26, wherein each point other than the route starting point and a route end point corresponds to an object-redirecting obstruction.

28.   The method of claim 27, wherein the play field and the obstructions thereon are stationary.

29. The method of claim 26, wherein the object is a ball.

30. The method of claim 26, and further comprising establishing for each outcome a set of final conditions.

31. The method of claim 30, wherein each set of final conditions is established by random selection from a collection of possible final conditions.

32. The method of claim 26, and further comprising predetermining a pay table including a list of possible outcomes and a corresponding win amount for each outcome and, looking up the selected outcome in the pay table and awarding the player the corresponding win amount.

33. A video gaming machine which simulates a real physical game initiated by placing an object in motion in accordance with a set of initial conditions and proceeding to one of a plurality of outcomes corresponding respectively to final resting conditions of the object, the gaming machine comprising:

a player input device for activating the game,

a display device,

a processor operating under control of a stored program and responsive to the input device for controlling the display device,

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a memory device coupled to the processor and storing a mathematical model of the game including a plurality of rules governing movement of the object once it is placed in motion, and a pay table of win amounts respectively corresponding to different outcomes,

and a payout mechanism,

the processor program including a first routine responsive to a player input for randomly determining an origin state and running it through the model for simulating movement of the object to a final resting condition to determine an outcome and controlling the display device to display the simulated movement of the object, and

a second routine for determining from the pay table a wire amount corresponding to the outcome and actuating the payout mechanism to award that amount to the player.

34. The gaming machine of claim 33, wherein the origin state is defined by a set of initial conditions, and the first routine including a routine for randomly generating each initial condition of the set.

35. The gaming machine of claim 33, wherein the origin state is defined by a set of initial conditions, the memory device including means for storing a collection of sets of initial conditions, the processor program including a routine for randomly selecting a set of initial conditions from the collection.

36. The gaming machine of claim 33, wherein the memory device includes means for storing a plurality of points on a play field including a route starting point, one or more route end points and a plurality of intermediate points wherein each intermediate point has one or more paths leading to it and one or more paths leading away from it and the route starting point has one or more paths leading away from it and each route end point has one or more paths leading to it, the origin state being defined as the route starting point, the processor program including a routine for randomly selecting one of the paths leading from the route starting point and causing the object to traverse the selected path and then repeating the process until a route end point is reached.

37. The gaming machine of claim 33, wherein the memory device includes means for storing a collection of sets of final conditions respectively corresponding to outcomes, the processor program includes a routine for randomly selecting an outcome and a set of final conditions corresponding to it and then running the selected set of final conditions backwards through the model to determine the origin state.

38. A method of developing a pay table for a video gaming machine which simulates a real physical game initiated by placing an object in motion in accordance with a set of initial conditions and proceeding to one of a plurality of outcomes corresponding respectively to final resting conditions of the object, the method comprising:

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establishing in software a mathematical model of the game including a plurality of rules

governing movement of the object once it is placed in motion,

creating a list of outcomes,

assigning a probability of occurrence to each outcome,

assigning a win amount to each outcome, and

determining a pay table percentage by multiplying each outcome's probability of

occurrence by its win amount and summing the products for all of the outcomes in the list.

39. The method of claim 38, wherein the list of outcomes and their associated

probabilities of occurrence are determined by selecting a plurality of sets of initial conditions and

sequentially running the sets through the model to determine corresponding outcomes and to

determine for each outcome a probability of occurrence.

40. The method of claim 39, wherein the sets of initial conditions are selected by

randomly generating each condition of each set.

41. The method of claim 39, wherein the sets of initial conditions are selected by

randomly selecting sets from a collection of sets of initial conditions.

42. The method of claim 38, wherein the list of outcomes is created by determining a

finite collection of points on a play field including a route starting point and at least one route

end point and a finite collection of possible paths of the object from one point to another, such that each point except a route end point has one or more paths leading away from it, and establishing for each point a probability of occurrence equal to the sum of the probabilities of all paths that lead to the point, setting an initial probability of occurrence for each path, and setting for each path a probability of occurrence equal to the path's probability multiplied by the probability of the point from which it leads.

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